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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,201	02/07/2002	Hiroyuki Otaki	TJK/213	3764
27717 7590 12/29/2006 SEYFARTH SHAW LLP 131 S. DEARBORN ST., SUITE2400 CHICAGO, IL 60603-5803			EXAMINER ANGEBRANNDT, MARTIN J	
			ART UNIT	PAPER NUMBER
			1756	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		12/29/2006	PAPER	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

10/072,201

Applicant(s)

OTAKI ET AL.

Examiner

Martin J. Angebrannt

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 27 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,4-8,10-24,41 and 43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1,4-8,10-19,41 and 43 is/are allowed.
- 6) ☒ Claim(s) 20-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

Art Unit: 1756

1. The response provided by the applicant has been read and given careful consideration.

Responses to the arguments of the applicant are presented after the first rejection to which they are directed.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 15 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 14 and 15 are substantial duplicates (the only difference is the use of the term organometallic compound vs. organic silicon compound, but this is negated by the use of the same formula, general formula 4), **please cancel claim 15.**

**Please note that the limitation sdo not further modify general formula 3 in claims 13 and that the organometallic particle must not be Tl, Zr, Zn, In or Sn. (Note the Tl is likely supposed to be Ti)**

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda et al. '771, in view of Sato et al. '846, Baney et al., "Silsesquioxanes" Chem. Rev. vol 95(5) pp. 1409-

Art Unit: 1756

1430 and Krug et al., "Fine Patterning of Thin Sol-gel Films", J. non-cryst. Sol. Vol. 147/148 pp. 447-450, (1992).

Maeda et al. '771 teach the use of solgel processing to form useful holographic recording media, where a sol-gel processing is used to form a matrix in situ and mixed with photopolymerizable materials. Example 1 describes a silanol terminated polydimethylsiloxane, TEOS, various acrylates, a photoinitiator, which are combined and coated to form a holographic recording layer. The formation of silica particles in the sol-gel process, having sizes of 10-100 nm is disclosed. (17/36-37).

Sato et al. '846 teach the use of silicon containing monomeric compounds in holographic recording media, specifically those which contain both free radically and cationically polymerizable materials. (see examples) Useful silicon containing cationically curable compounds are disclosed (3/48-4/4). The use of cationically reactive binders is disclosed. (7/15-24). The use of silane coupling agents is also disclosed. (7/11)

Baney et al., "Silsesquioxanes" Chem. Rev. vol 95(5) pp. 1409-1430 describes various techniques for forming organic/inorganic hybrid, including those containing moieties, which may be photocured, such as epoxides and vinyl moieties. (page 1426, section VB, right column)

Krug et al., "Fine Patterning of Thin Sol-gel Films", J. non-cryst. Sol. Vol. 147/148 pp. 447-450, (1992) teaches the method for forming photocurable sol-gel polymers where methacrylate monomers are reacted with alkoxides and then with other monomers.

It would have been obvious to modify the process of Maeda et al. '771 by adding silicon containing monomeric compounds to the reactive sol-gel matrix, such as those containing epoxide moieties taught by Sato et al. '846, with a reasonable expectation that these would be

Art Unit: 1756

compatible and that epoxide containing reactive binder are desirable in holographic recording media, using technique similar to those disclosed by Baney et al., "Silsequioxanes" Chem. Rev. vol 95(5) pp. 1409-1430 and Krug et al., "Fine Patterning of Thin Sol-gel Films", J. non-cryst. Sol. Vol. 147/148 pp. 447-450, (1992) to form the epoxide containing polymerizable matrix with a reasonable expectation of forming a useful holographic recording medium.

The applicant argues that the refractive index modulation is through the organic-inorganic hybrid polymer and argues that the resultant polymer of the invention has the desired flexibility, rigidity and heat resistance. The examiner notes that none of these properties are recited and that the use of sol-gel processes to form a more rigid matrix using materials embraced by formula 2 which prevents shrinkage and the corresponding wavelength shift and the use of coupling agents to improve the adhesion of the organic components to inorganic materials, such as the sol-gel matrix is also known. These coupling agents have unsaturation in them (ie vinyl, acryl or methacryl moieties) and are embraced by formulae 1, 3 and 4 of the instant claims. These would inherently form a compound having a different refractive index from the unreacted coupling agent upon crosslinking and/or polymerization. **In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).** As the sol-gel compositions of the prior art are all solution coated, the arguments regarding that point seem to be incorrect. The applicant may have found improvements, beyond those obvious from the teachings of the references, but that is not clear at this juncture. The examiner also notes that allegations of refractive indices, which

Art Unit: 1756

are not supported by evidence are unpersuasive. The issue of pendant shape seems to refer to an unrecited feature.

The applicant may submit declaration evidence concerning unobvious results when compared to compositions (such as those of Maeda et al. '771) where the sol gel precursor does not include a polymerizable moiety. The references are analogous, mostly dealing with sol-gel materials and establish a basis of equivalence and a reasonable expectation of the different sol-gel matrices being equivalent in function and the reasonable expectation of success in forming a useful. The ability to bond a monomer to the matrix due to the reactivity of the photopolymerizable moiety of the silane derivative and the photopolymerizable compound (and the monomer) would have been obvious to one skilled in the art and no clear benefit resulting from this is present in the record. The rigidity would be related to the degree of crosslinking in the matrix, rather than the presence of the organic moiety as a side chain. The silicon compound is not limited to the case where more than one photopolymerizable moiety is present and the monomer forming the organic portion of the hybrid polymer is difunctional and so would be present in the polymeric backbone. Therefore the argued properties do not necessarily flow from the entire genus circumscribed by the claims. Due to the presence of the organic component, the same compound reacting with itself would be capable of forming a compound/particle with a different refractive index than the hybrid polymer.

The applicant refers to a declaration, which does not appear to be of record. Further, the statements regarding the declaration are nonsensical. The refractive index is unitless and attaching percentages to it is ridiculous. The applicant may be referring to diffraction efficiency, but that simply cannot be determined without the document at hand. The applicants may also be

Art Unit: 1756

referring to the diffraction efficiency in the reference and those in the instant specification, but the instant specification does not discuss diffraction efficiency and actual measurement is preferred to a calculation. The applicant likely has this data. There is also the issue of the showing being commensurate in scope, noting that the applicant only asserts evidence with respect to a single examples and in doing this neglects the fact that the (maximum) possible diffraction efficiency is dependent upon the amount of the photopolymerization reactive compound present, the photoinitiator and the exposure/processing conditions. The position of the examiner is that in the sol-gel process, some of the materials will form isolated areas not chemically connected to the matrix and that these are particles within the scope of coverage sought as no limits on size or the composition until claims 42 and 43. Further, the sizes in claims 43 embrace a tetramer or so of a siloxane as well as small silica particles disclosed by Maeda et al. '771, based upon the small size of the lower limit.

The limitations of claims 43 are not present in these claims and the are NOT dependent upon claim 13. The examiner recommends canceling them.

6. Claims 1,4-8,10-1941 and 43 are allowable.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37


Art Unit: 1756

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Martin J. Angebrannndt whose telephone number is 571-272-1378. The examiner can normally be reached on Monday-Thursday and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Martin J. Angebrannndt  
Primary Examiner  
Art Unit 1756

12/22/2006